REMARKS

Clarifying amendments have been made to claims 5, 14, 21, 32 and 35-39.

Claims 40-44 have been added.

Claims 1-25 and 32-44 are pending.

The applicant thanks the Examiner for indicating that claims 6, 13, 15, 20, 22, 23 and 35-39 include allowable subject matter.

Claims 1-5, 7-12, 14, 16-19, 21, 24, 25 and 32-34 stand rejected as unpatentable over U.S. Patent No. 4,620,215 (Lee). As discussed below, applicant respectfully requests reconsideration.

Although a single prior art reference may, in appropriate circumstances, render a claim obvious, there must be showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the conclusion of obviousness. *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000) (reversing conclusion of obviousness).

A single line in a reference may not be taken out of context and relied upon with the benefit of hindsight to show obviousness. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 448 (Fed. Cir. 1986). Similarly, boilerplate statements in a prior art reference that other embodiments and the like can be used are generally insufficiently specific to support a finding of obviousness. *See, e.g., Fromsom v. Anitec Printing Plates, Inc.*, 132 F.3d 1437, 1447 (Fed. Cir. 1997). Moreover, the mere fact that the prior art reference could be modified does not satisfy the requirements for a finding of obviousness. *In re Laskowski*, 871 F.2d 115, 117 (Fed. Cir. 1989); *In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990). Instead, the suggestion or motivation to modify the prior art must be "clear and particular." *See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, (Fed. Cir. 1998); *Teleflex, Inc. v. Ficosa North Am. Corp.*, 299 F.3d 1313 (Fed. Cir. 2002).

As explained by the Court of Appeals for the Federal Circuit:

> While the test for establishing an implicit teaching, motivation, or suggestion is what the combination of [ ] two statements of [the prior art reference] would have suggested to those of ordinary skill in the art, the two statements *cannot be viewed in the abstract.* Rather, they must be considered *in the context of the teaching of the entire reference.* Further, a rejection cannot be predicated on the mere identification in [the prior art reference] of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

In re Kotzab, 217 F.3d at 1371 (emphasis added).

The requirement of a clear and particular suggestion or motivation prevents the use of improper hindsight based, for example, on the applicant's own disclosure as a blueprint for forming a faulty obviousness argument. *See, e.g., In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *Ecolochem, Inc. v. Southern California Edison Co.*, 56 USPQ2d 1065, 1072-73 (Fed. Cir. 2000). As explained by the Court of Appeals for the Federal Circuit:

> Close adherence to [the required] methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one 'to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.'"

In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999).

As discussed below, the required suggestion or motivation for modifying the cited reference to obtain the claimed subject matter is lacking.

Each of independent claims 1, 5, 14, 21 and 32 recites a heat radiating substrate containing aluminum as a major component.

The Office action states, in part, as follows:

> Lee teaches the provision of using aluminum in column 1 discussion of prior art. Although the invention of Lee is primarily discussed relative to the use of copper, the substitution of aluminum for copper is well known in heat sink technology as established by the prior art teachings of Lee. Figures 3-10 therefore as applied to copper can be equally applied to aluminum.

Applicant respectfully disagrees.

First, the only mention of aluminum in the Lee patent occurs at col. 5, line 64 in connection with the bonding pad 73A on a silicon IC chip 70 (FIG. 6). That disclosure is unrelated to the material used for the heat sinks.

The Lee patent states, in connection with FIG. 1 that "A heat sink 25 is mounted on the back surface 12 of chip 10, typically by forming a gold-silicon eutectic bond 26 between the heat sink 25 and the chip 10." Nowhere in the Lee patent is there a description that the heat sink 25 is, or could be, made of aluminum.

The remainder of the Lee patent emphasizes the use of a copper heat sink 80 that may be provided above the IC chip 70 (*see, e.g.*, FIGS. 11, 12; *see also* FIGS. 7, 8). Therefore, the only disclosure, or suggestion, in the Lee patent is to use copper as the material for a heat sink.

Furthermore, the Lee patent suggests attaching solder to the copper heat sink (*see, e.g.*, Fig. 7). The Lee patent would not have taught, suggested, or motivated one to use aluminum as a major component of the heat sink because it is difficult to adhere a brazing solder on aluminum (*see* Specification at page 22, lines 10 to 18). Therefore, the techniques disclosed in the Lee patent as applied to copper could not be equally applied to aluminum.

At least for the foregoing reasons, the rejections of the claims as unpatentable over the Lee patent should be withdrawn.

The dependent claims recite additional features that make those claims independently patentable.

For example, claims 35-39 recite that the heat radiating substrate is disposed on a portion of a metal body thermally coupled thereto, and that the heat radiating substrate is attached to a semiconductor device, whereby the heat radiation substrate provides minimal oxide particles scattering from the oxide film.

The Lee patent does not recognize or appreciate the advantageous effects of forming an oxide film on a portion of a heat radiating substrate having aluminum as a major component as recited in some of the claims. An oxide film formed on the copper heat sink disclosed in the Lee patent would not be stable. When a heat sink made of copper is exposed to a highly humid environment, fine oxide is scattered. The scattered oxide can adversely affects electronic devices provided around the heat sink. In contrast, an oxide film formed on a heat radiating substrate containing aluminum can be dense, and therefore, the oxide is not scattered to adversely affect the surrounding devices. Also, the use of aluminum instead of copper may reduce the weight of the device.

Claims 40-44 have been added to indicate the context in which the heat sink or semiconductor module may be used, as suggested by the Examiner during a telephone conference on August 10, 2004.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this

paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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